

THE SUNDIAL OR SHADOW CLOCK

Website references: <https://goo.gl/aJ6aXb>
<https://goo.gl/8GrVqD>

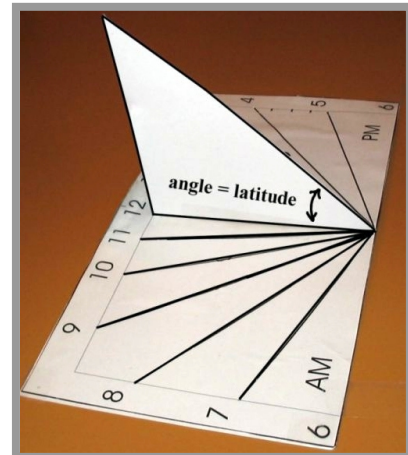
A sundial is a device that tells the time by the cast shadow by a small stick on a graduated plane.

The sundial has:

1. A plane surface with different divisions corresponding to day hours and
2. A gnomon (small stick) that produces the shadow on the surface.

There are different types of sundials: horizontal - place on the floor-, vertical -place on a wall-, equatorial - that has the same slope as the equatorial plane -.

This implies different angles for the gnomon and different angles of separation for each hour.

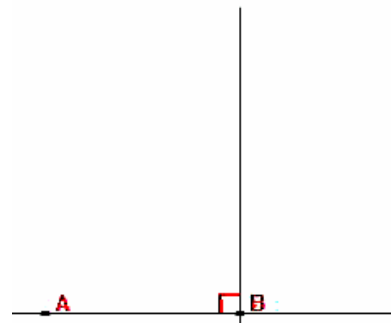


MAKE YOUR OWN HORIZONTAL SUNDIAL

Materials required: A pencil, protractor, compass and a straight edge.

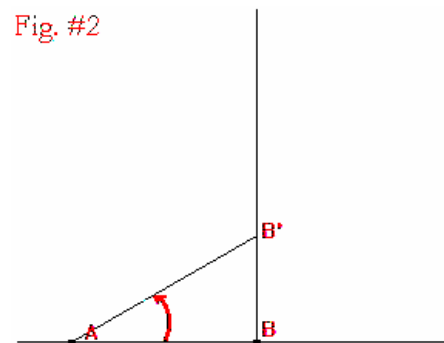
Step 1

Draw on a paper a vertical line; now draw a line perpendicular (AB) to the vertical line. (Fig. #1)



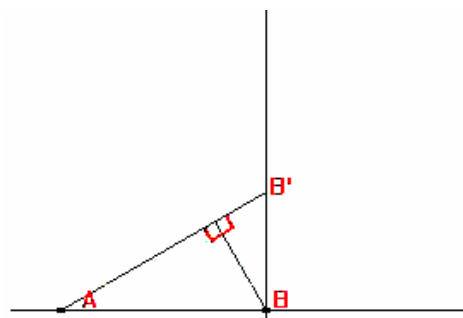
Step 2

Now draw a line from A through the vertical line so that angle B'AB is equal to the latitude of the place where the sundial is to be used. Remember this angle for making the gnomon. (Fig. #2). 40° for Spain.



Step 3

Draw a line perpendicular to line AB' from B. (Fig. #3)

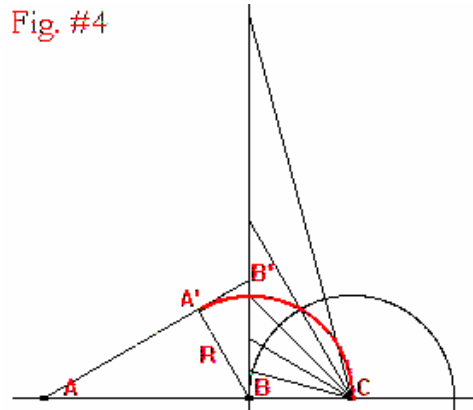


Step 4

Now use the distance A'B to find C (use the compass), draw a semi-circle centered at C and divide it into 15 degree pieces (use the protractor). (Fig. #4)

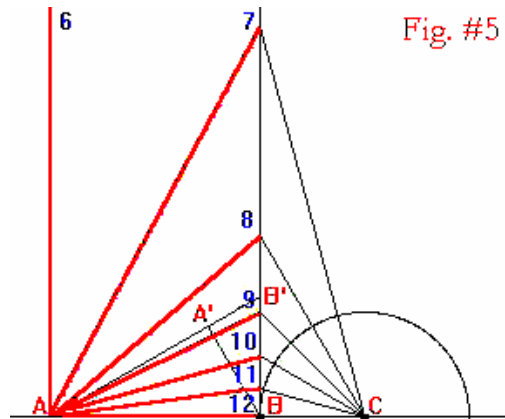
Why 15 degrees? One day is 24 hours. So in 24 hours the sun "moves" through 360 degrees. Therefore $360/24=15$ degrees, this is called the hour angle of the sun.

Fig. #4

**Step 5**

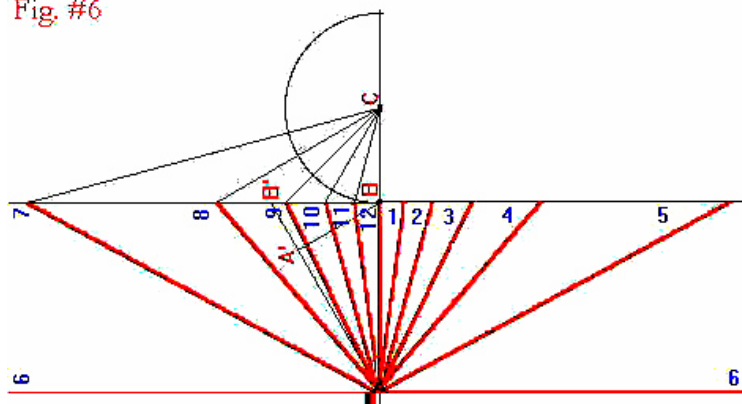
Connect the 15 degree points along line BB' to point A. These are the hour lines for your sundial. Draw a line through A and parallel to line BB', this is the 6:00 hour line. (Fig. #5)

Fig. #5

**Step 6**

To find the morning hour line "flip" the afternoon hour lines over the 6 hour line. (Fig. #6)

Fig. #6



All that is left is to add the gnomon and set the dial in the sun. The gnomon is a triangular piece that has one angle equal to the latitude of the place where the dial is to be used.